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Trends in PULPWOOD PRODUCTION and CONSUMPTION in the CENTRAL STATES

Joseph J. Mendel

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Central States Forest Experiment Station, Columbus, Ohio

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THE AUTHOR

JOSEPH J. MENDEL began his Forest Service career in 1946 on the Forest Survey of the northeastern states. After 6 years of aerial photo interpretation and field work he was transferred to Washington, D. C. on a special photo interpretation project conducted in cooperation with the U. S. Air Force. Changing assignment but not location in 1957, Mendel worked as an analyst in Foreign Forestry until 1958 when he came to the Central States Station as Forest Survey Representative. Recently he took over the Station's research in production economics. A native of Wisconsin, Joe received his B. S. in forestry at the University of Michigan. In addition, he did some graduate work in forestry and engineering at the Universities of Michigan and Cincinnati.

Central States Forest Experiment Station, U.S. Dept. of Agriculture
Forest Service, 111 Old Federal Building, Columbus 15, Ohio
R. D. Lane, Director

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The timber resource of the Central States can support continued expansion of the pulpwood industry. Records for the past 6 years indicate the annual cut of pulpwood is well below the annual pulpwood growth. This is true despite the steady increase in pulpwood production in the region.

More than 1.8 million cords of pulpwood were harvested from Central States timberlands from 1955 through 1960. Pulpwood production[1] has increased more than 150 percent, from a low of 192,000 cords in 1955 to almost one-half million cords in 1960 (fig. 1). The 1960 harvest delivered at the mill had a value of more than 6½ million dollars. Consumption of pulpwood by Central States pulpmills during this period was approximately the same as production.

Based on current trends, it is expected that by 1965 pulpwood production in the Central States will increase to more than 1 million cords annually.

PRODUCTION

The total 6-year pulpwood production amounted to 1,825,000 cords, 46 percent of which was soft hardwoods[2], 46 percent hard hardwoods[3], and 8 percent conifers (table 1). From 1955 to 1958 both soft- and hard-hardwood production increased; production of soft hardwoods was 20 to 25 thousand cords greater than hard-hardwood annual production (fig. 2). However, in 1959 and 1960 production of hard-hardwood pulpwood exceeded that of soft hardwoods. Although production of coniferous pulpwood is low, it is increasing; in 1960 almost 40,000 cords of coniferous pulpwood were harvested.

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[1]"Production" is "the harvest of pulpwood from timberlands" whereas "consumption" is "the utilization of pulpwood by mills."

[2]Soft hardwoods include such species as basswood, yellow-poplar, aspen, cottonwood, willow, and soft maple.

[3]Hard hardwoods include such species as oak, ash, hard maple, and beech.

TABLE 1. — *Pulpwood production in the Central States, 1955-60*

(In standard cords)[1]

Year and species	Ohio	Illinois	Indiana	Iowa	Kentucky	Missouri	Total
1955[2]							
Conifers	0	0	0	0	12,774	1,222	13,996
Hard hardwoods	60,681	5,220	2,195	0	7,748	0	75,844
Soft hardwoods	19,143	47,105	16,802	4,635	14,057	0	101,742
Total	79,824	52,325	18,997	4,635	34,579	1,222	191,582
1956[2]							
Conifers	1,077	101	0	0	24,963	1,030	27,171
Hard hardwoods	74,080	6,838	2,350	3,130	12,128	108	98,634
Soft hardwoods	20,193	53,193	14,274	11,566	16,262	3,893	119,381
Total	95,350	60,132	16,624	14,696	53,353	5,031	245,186
1957							
Conifers	773	594	0	0	22,282	1,585	25,234
Hard hardwoods	81,838	2,850	2,542	4,018	6,734	1,087	99,069
Soft hardwoods	34,230	50,550	14,310	10,487	7,078	6,772	123,427
Total	116,841	53,994	16,852	14,505	36,094	9,444	247,730
1958							
Conifers	780	0	0	0	16,337	1,830	18,947
Hard hardwoods	91,315	7,044	7,095	5,636	12,906	2,077	126,073
Soft hardwoods	48,420	57,190	17,523	9,443	5,878	8,110	146,564
Total	140,515	64,234	24,618	15,079	35,121	12,017	291,584
1959							
Conifers	828	95	0	0	21,029	1,319	23,271
Hard hardwoods	112,095	18,222	15,371	9,326	25,717	2,222	182,953
Soft hardwoods	52,332	63,075	13,123	11,803	4,970	6,234	151,537
Total	165,255	81,392	28,494	21,129	51,716	9,775	357,761
1960							
Conifers	1,458	2,239	1,213	100	32,957	1,836	39,803
Hard hardwoods	151,820	20,687	29,099	8,020	38,563	3,304	251,493
Soft hardwoods	61,081	84,728	25,393	15,376	5,043	8,686	200,307
Total	214,359	107,654	55,705	23,496	76,563	13,826	491,603
1955-60 Total							
Conifers	4,916	3,029	1,213	100	130,342	8,822	148,422
Hard hardwoods	571,829	60,861	58,652	30,130	103,796	8,798	834,066
Soft hardwoods	235,399	355,841	101,425	63,310	53,288	33,695	842,958
Total	812,144	419,731	161,290	93,540	287,426	51,315	1,825,446

1/ Standard cord = 4x4x8 feet of stacked bolts, 0.8 long cord or unit, 4,500 pounds of soft hardwoods, 5,000 pounds of hard hardwoods or conifers.

2/ Previously published figures revised to conform with conversion factors in 1/.

Throughout the 6-year period, no changes occurred in ranking of the six Central States in production (fig. 3). Ohio woodlands supplied more than 44 percent of the total 6-year pulpwood harvest. Illinois was second, accounting for 23 percent, and the other four Central States produced the remaining 33 percent.

Almost 70 percent of the hard-hardwood pulpwood produced during 1955 through 1960 came from Ohio. Illinois was the largest producer of soft hardwoods, accounting for more than 42 percent of the 6-year production, while Kentucky produced almost 90 percent of the conifers harvested for pulpwood.

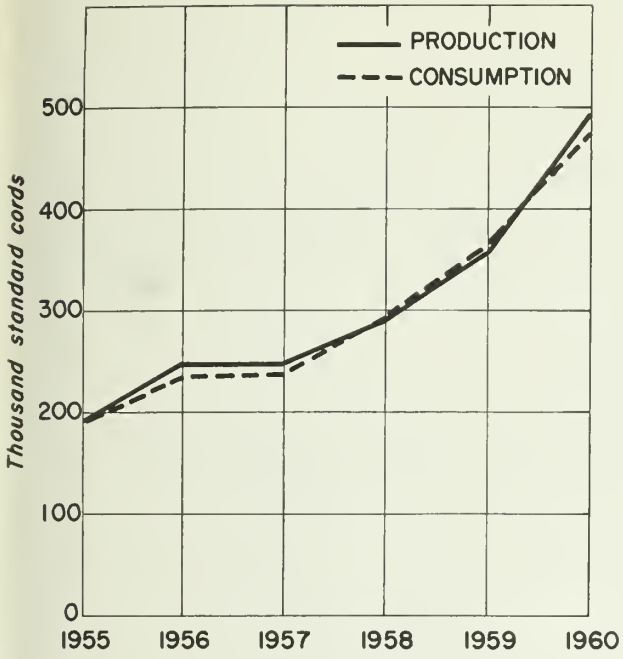


FIGURE 1. — *(Left) Pulpwood production and consumption in the Central States, 1955-60.*

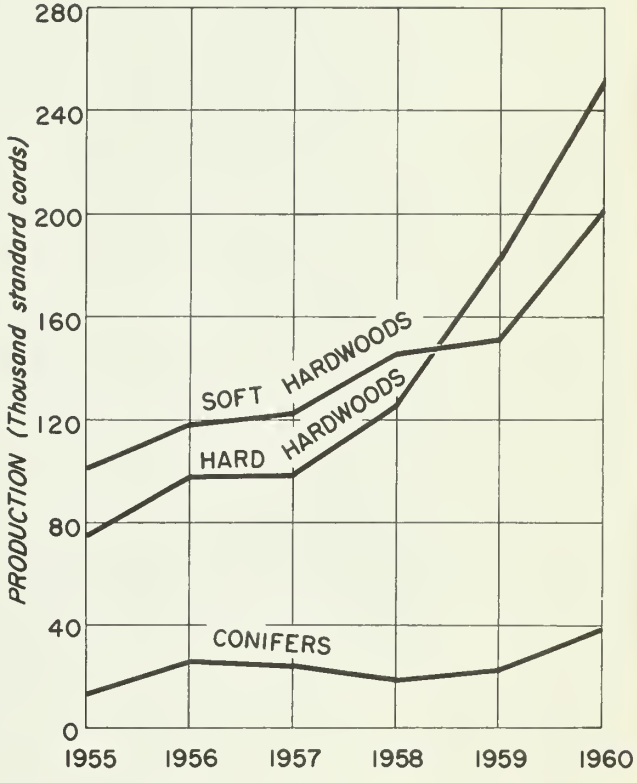


FIGURE 2. — *(Right) Pulpwood production in the Central States by species groups, 1955-60.*

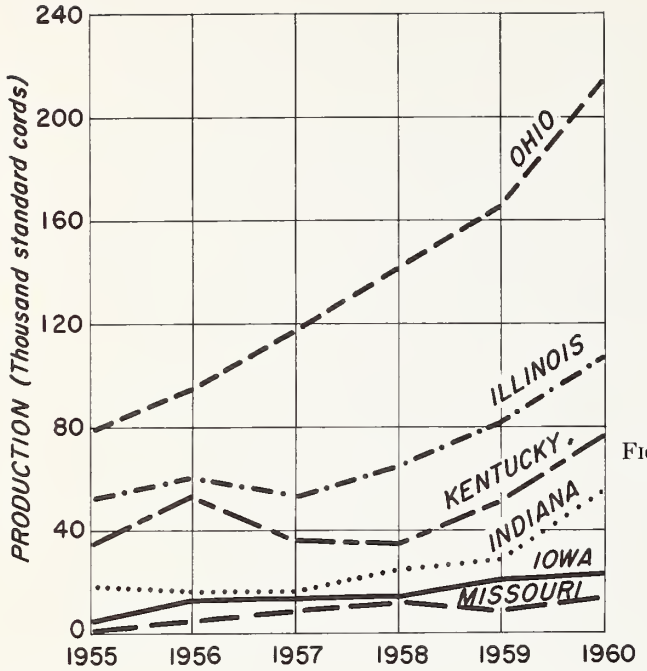


FIGURE 3. — *(Left) Pulpwood production in the Central States by states, 1955-60.*

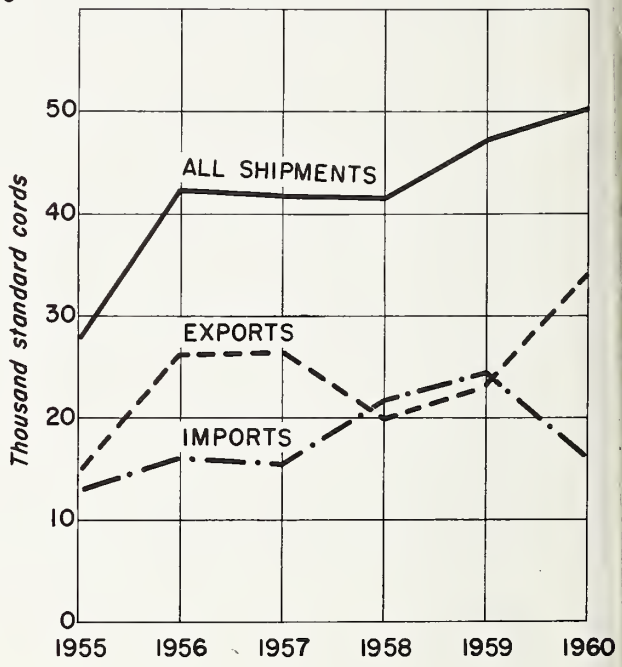


FIGURE 4. — *(Right) Pulpwood shipments into and out of the Central States territory, 1955-60.*

CONSUMPTION

Consumption followed much the same pattern as production, increasing 149 percent over that of 1955 (fig. 1). Pulpwood consumption from 1955 through 1960 amounted to more than 1,787,000 cords, of which 51 percent was soft hardwoods, 47 percent was hard hardwoods, and only 2 percent was conifers (table 2). The minor differences between production and consumption are due to shipments of pulpwood into and out of the Central States territory.

Ohio mills consumed 55 percent of the total pulpwood utilized during the 6-year period; Illinois mills consumed 27 percent; and mills in Indiana, Iowa, and Missouri consumed the remaining 18 percent.

During the 6-year period Central States pulpmills consumed only about 31 percent of the coniferous pulpwood produced in the region; all of the hard hardwoods were consumed within the region, while consumption of soft hardwoods exceeded production by more than 7 percent or about 63,000 cords.

INTERREGIONAL SHIPMENTS

From 1955 through 1960 shipments of Central States pulpwood to and from neighboring states amounted to 250,000 cords. About 144,000 cords (58 percent) were "exported" and 106,000 cords (42 percent) were "imported" (table 3).

More than 91 percent of the pulpwood imported into the Central States came from Wisconsin; the remainder came from West Virginia, Michigan, Tennessee, Alabama, South Dakota, and Nebraska. About 63 percent of the imports was soft hardwoods, 30 percent was conifers, and 7 percent was hard hardwoods. Illinois mills were the principal recipients of the imports.

About 93 percent of the pulpwood exported from the Central States was conifers; almost 5 percent was hard hardwoods, and 2 percent was soft hardwoods. More than 91 percent of the pulpwood exported was harvested from Kentucky timberlands; 7 percent from Ohio, and the remaining 2 percent from Missouri and Illinois.

While the overall trend in interregional pulpwood shipments is upward, much fluctuation is evident when imports are compared with exports (fig. 4). From 1955 to 1957 exports of pulpwood were greater than imports. In 1958 and 1959, the reverse was true. But in 1960, exports again exceeded imports.

The Central States export more coniferous pulpwood than they import but they import more soft-hardwood pulpwood than they export. Imports and exports of hard-hardwood pulpwood are about equal.

PULPWOOD CUT RELATED TO THE TIMBER RESOURCE

Approximately 22 percent or 42.5 million acres of the land in the Central States is classified as commercial forest land. The timber resources of this forest area are growing annually at the rate of 18.4 million cords[1]. The 1960 pulpwood cut of 491,000 cords represents approximately 3 percent of this annual growth.

In analyzing the relation between the pulpwood cut and the timber resources, the location of the resources is important. More than 60 percent of the forest land of the Central States is located in Missouri and Kentucky, states that accounted for only 18 percent of the 1960 pulpwood production. The most heavily forested areas are the least utilized for pulpwood production (figs. 5 and 6): almost two-fifths of the production was obtained from

[1]Hutchison, O. Keith and Thornton, Philip L. Timber resources of the Central States. U. S. Dept. of Agr., Forest Service, Cent. States Forest Exp. Sta. Misc. Release 13, 30 pp., illus.

FIGURE 5. — *Commercial forest and wood-using pulpmills in the Central States by county.*

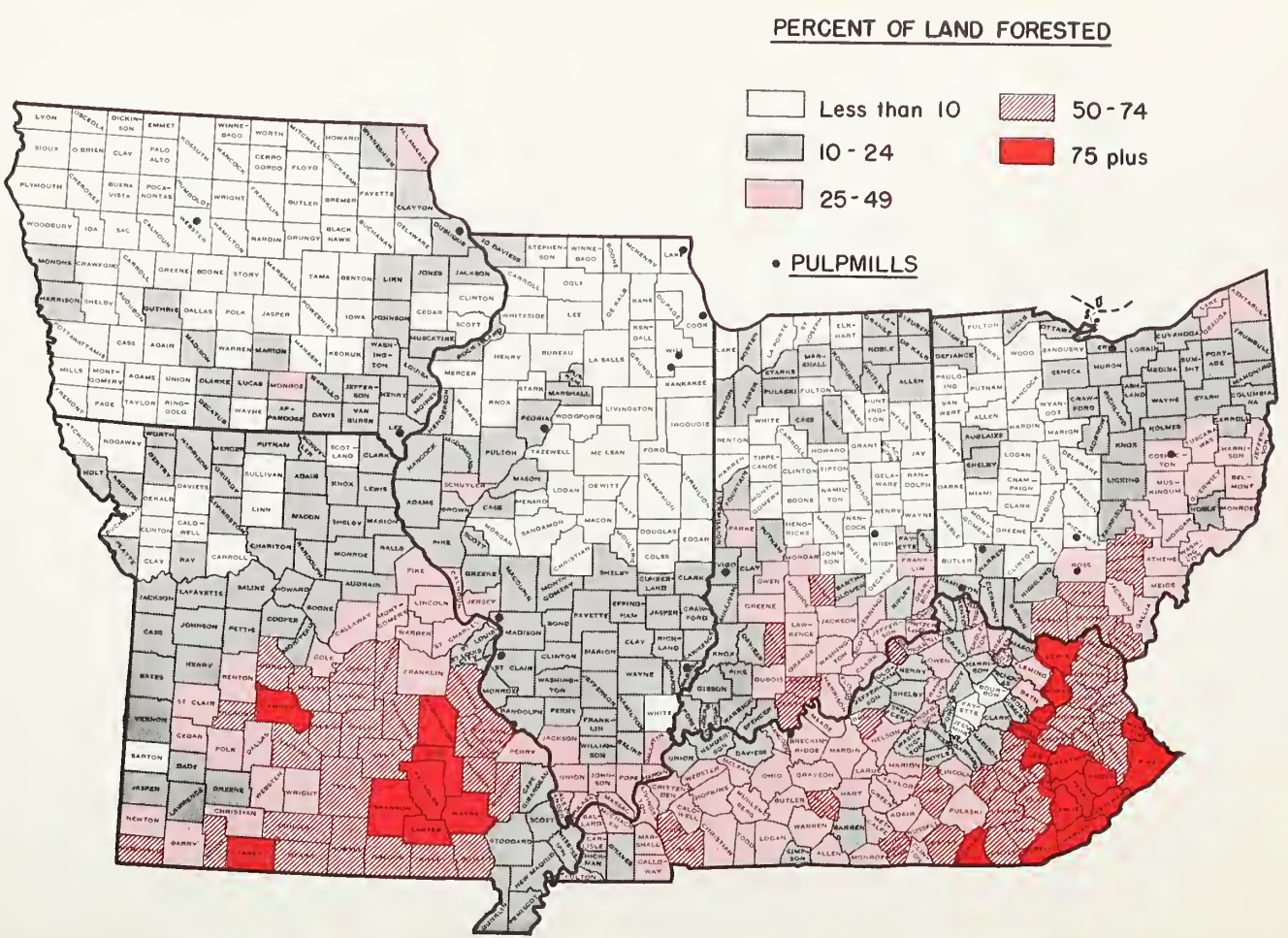
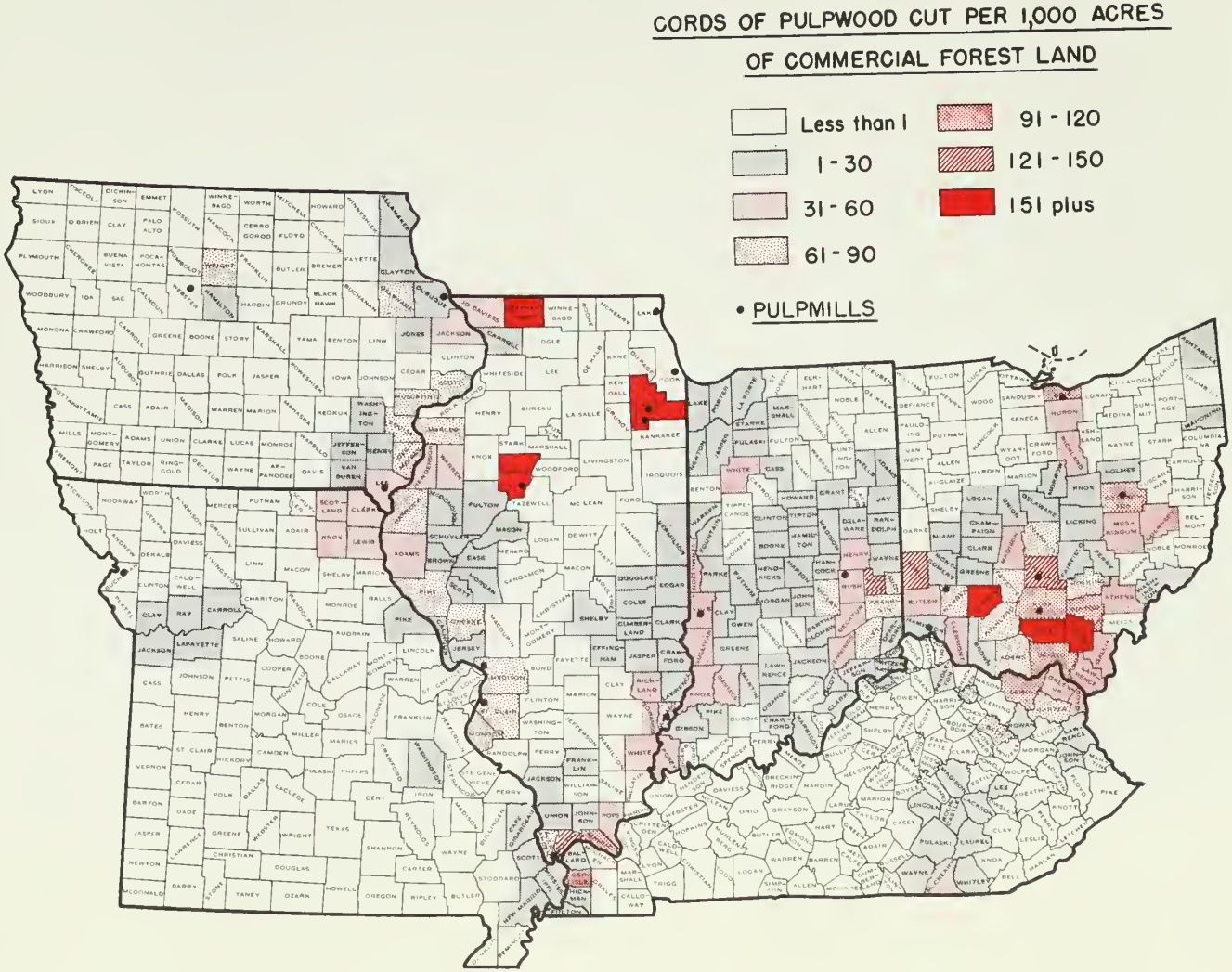


FIGURE 6. — *The 1960 pulpwood cut by county and the location of pulpmills.*



counties that were less than 25 percent forested. The remaining three-fifths was harvested from counties in which forest covers more than 25 percent of the land. Most of the three-fifths came from only 84 of these 201 heavily forested counties; 117 of the 201 counties supplied less than a cord of pulpwood per 1,000 acres of forest land.

In south-central Ohio, the area of heaviest pulpwood cutting in 1960, more than 100 cords of pulpwood were harvested per 1,000 acres of forest land. Although this cut varied by county, it averaged about 8 cubic feet per forest acre. This cut does not approach the annual net growth, estimated to be 38 cubic feet per acre.

It is clear then that the timber resources of the Central States can easily support the present pulpwood harvest. However, the extent to which these timber resources can support an expansion of the pulpwood industry needs careful consideration. It must be recognized that other wood-using industries draw on this timber resource and that not all of the annual growth is available for pulpwood production. Also there is the need to reserve some of the annual growth to build up the growing stock both in tree size and quality.

TABLE 2. — *Pulpwood consumption in the Central States, 1955-60*

(In standard cords)

Year and species	Ohio	Illinois	Indiana Iowa Missouri[1/]	Total
1955				
Conifers	500	5,422	0	5,922
Hard hardwoods	68,519	5,200	0	73,719
Soft hardwoods	42,201	56,504	11,588	110,293
Total	111,220	67,126	11,588	189,934
1956				
Conifers	750	6,631	0	7,381
Hard hardwoods	87,988	5,314	5,899	99,201
Soft hardwoods	42,779	63,320	22,462	128,561
Total	131,517	75,265	28,361	235,143
1957				
Conifers	0	7,161	0	7,161
Hard hardwoods	89,609	0	8,120	97,729
Soft hardwoods	46,375	63,293	22,213	131,881
Total	135,984	70,454	30,333	236,771
1958				
Conifers	6	8,670	0	8,676
Hard hardwoods	97,963	2,300	25,133	125,396
Soft hardwoods	54,770	71,266	33,184	159,220
Total	152,739	82,236	58,317	293,292
1959				
Conifers	0	8,620	227	8,847
Hard hardwoods	129,442	11,873	43,148	148,463
Soft hardwoods	51,859	71,146	42,773	165,778
Total	181,301	91,639	86,148	359,088
1960				
Conifers	718	7,802	100	8,620
Hard hardwoods	196,170	13,445	44,294	253,909
Soft hardwoods	67,150	84,579	59,044	210,773
Total	264,038	105,826	103,438	473,302
1955-60				
Conifers	1,974	44,306	327	46,607
Hard hardwoods	669,691	38,132	126,594	834,417
Soft hardwoods	305,134	410,108	191,264	906,506
Total	976,799	492,546	318,185	1,787,530

1/ Combined to prevent disclosure of individual plant consumption.
There are no pulpmills in Kentucky.

TABLE 3. — *Pulpwood imports and exports in the Central States, 1955-60*

(In standard cords)

IMPORTS

Year	Conifers	Hard hardwoods	Soft hardwoods	Total
1955	4,200	0	8,651	12,851
1956	5,500	1,137	9,420	16,057
1957	5,576	257	9,636	15,469
1958	6,840	1,136	13,594	21,570
1959	7,433	1,941	14,959	24,333
1960	2,514	2,785	10,604	15,903
Total	32,063	7,256	66,864	106,183

EXPORTS

1955	12,274	2,105	100	14,479
1956	25,290	570	240	26,100
1957	23,649	1,597	1,182	26,428
1958	17,111	1,813	938	19,862
1959	21,857	431	718	23,006
1960	33,697	369	138	34,204
Total	133,878	6,885	3,316	144,079

A LOOK FORWARD

Assuming that the trend established in the past 6 years will be continued in the next 5 years, pulpwood production in the Central States in 1965 should approximate 1.3 million cords (fig. 7). This is an increase of 160 percent over the 1960 production. Such a projection admittedly is highly speculative, but it is not without foundation. The pulp industry in the Central States is young and vigorous and has been stimulated by the recent "breakthrough" in use of hardwoods for pulp. The industry has just began to capitalize on this development.

What effect will industry expansion have on the timber resource? The estimated pulpwood production for 1965, 1.3 million cords, is 7 percent of the total annual growth. Certainly the forests of the Central States can easily supply the estimated needs of the pulpwood industry in 1965 and its continued expansion in the future. However, the availability of this wood supply is influenced by its location. As mentioned previously, the heavily forested areas of southern Missouri are virtually untapped for their pulpwood resource and much the same can be said of the forests of Kentucky. Prime consideration should be given to these areas for possible new mill sites or procurement territories.

Another question posed by the anticipated expansion of pulpwood production is whether the wood resource in the vicinity of established mills is adequate. Most of these mills are located in lightly forested areas and are drawing heavily upon the local forests. The problem then is essentially one of better forest management to supply more pulpwood.

Again let us use as an example the south-central part of Ohio where an average of 8 cubic feet per forest acre was harvested in 1960. The 160 percent increase in the pulpwood cut predicted for 1965 would amount to 21 cubic feet per acre if applied uniformly in this section of Ohio. This is more than half the estimated annual per-acre growth. But the volume available for pulpwood is limited by the cut for other products as well as growth. The projected pulpwood cut in this local area would approach or might even exceed the maximum available for pulpwood production under present conditions.

Therefore, better forest management and utilization in south-central Ohio and in many of the lightly forested counties throughout the Central States would benefit the pulp industry, woodland owners, and local communities. Both steps will increase the volume available for pulpwood and other timber products.

As the annual consumption of woodpulp products in the United States increases, it seems likely that the capacity of the Central States to supply the demand for pulpwood will be more fully realized. The continued expansion of pulpwood production and consumption in the Central States is favored by the region's proximity to large marketing areas and the extent and ready accessibility of its wood resource.

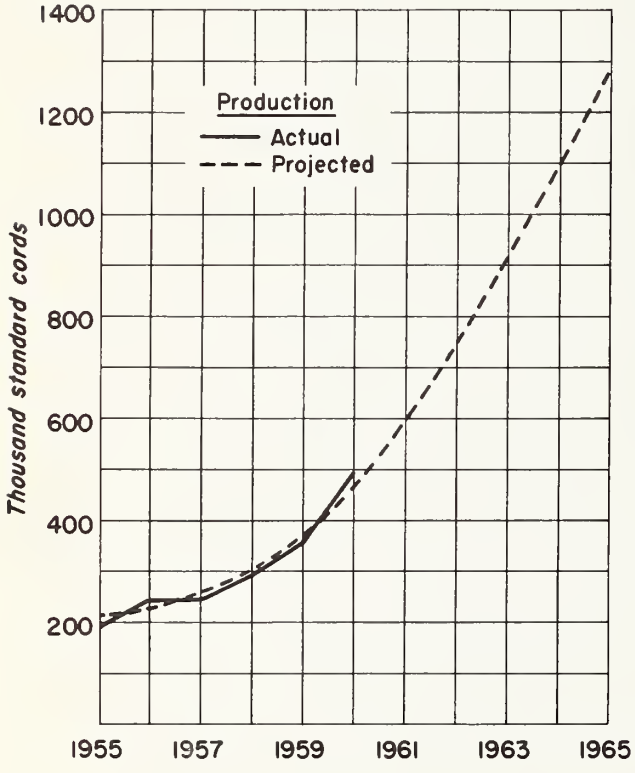


FIGURE 7. — *Pulpwood production trend in the Central States.*

Agriculture — Forest Service — Columbus, Ohio

The Central States Forest Experiment Station is headquartered at Columbus, Ohio and maintains major field offices at:

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